Chemistry 211 ***Name________________________***
Test 3 (Chapters 5 & 6) ***June 6, 2001***

Circle the best choice in each set of parentheses:

1. (2) When a bond is broken heterolytically, (heavy atoms, ions, mu mesons, photons, radicals, conservatives) are formed.

2. (2) When ions combine to form a covalent bond, it is called (anthropogenic, homogenic, photogenic, heterogenic, cryogenic, thermogenic) bond formation.

3. (2) The following reaction is an example of a(n): (addition, elimination, substitution, rearrangement) reaction.

$$CH_3CH{=}CH_2 \quad + \quad H_2S \longrightarrow CH_3\overset{\overset{\displaystyle SH}{|}}{C}HCH_3$$

4. (2) During the chlorination of methane, a small amount of ethane is formed during a (initiation, termination, propagation) step.

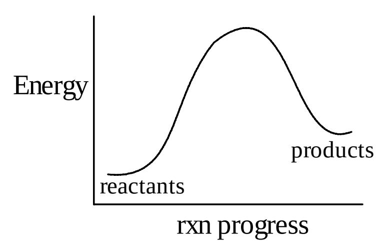
5. (4) Circle the species below which should act as nucleophiles.

$I^{\ominus}$ $H^{\oplus}$ $H^{\ominus}$ $SH^{\ominus}$

6. (4) Circle the species below which should act as electrophiles.

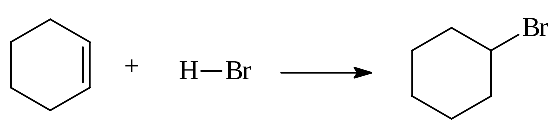
$H^{\oplus}$ $NO_2^{\ominus}$ $NO_2^{\oplus}$ $I_3^{\oplus}$

7. (4) Referring to an energy vs. reaction progress diagram (right) the height of the energy barrier between reactants and products affects the (equilibrium constant, rate) of the reaction; the difference in energy between reactants and products affects the (equilibrium constant, rate) of the reaction.



8. (4) Given the table of homolytic bond dissociation energies below, calculate (estimate) the enthalpy of the following ionic reaction (be sure to indicate whether the reaction is endothermic or exothermic; a proper sign of the ΔH_{rxn} will suffice)

C=C	611 kJ/mol
C-C	376 kJ/mol
C-Br	274 kJ/mol
H-Br	366 kJ/mol
C-H	420 kJ/mol
Br-Br	193 kJ/mol

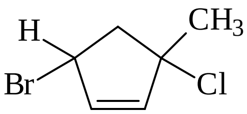


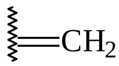
Test 2

Test 3

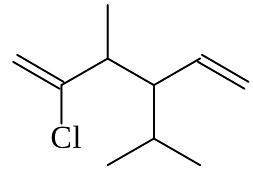
9. (3) Briefly state Markovnikov's rule (as he formulated it in 1869):

10. (6) Write the correct, complete IUPAC name for each of the following:

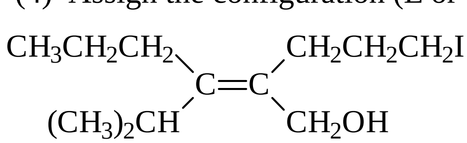


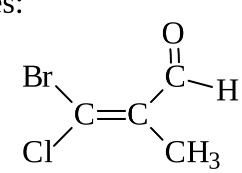


(group name only)

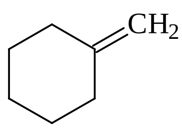


11. (4) Assign the configuration (E or Z) of the following alkenes:

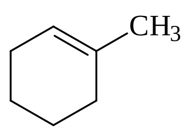


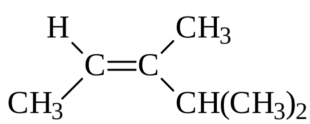


12. (4) Circle the more stable (lower energy) alkene in each pair of isomers.

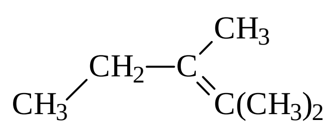


or

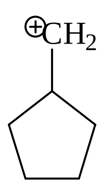




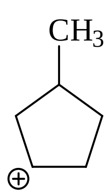
or

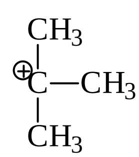


13. (6) Below each cation write its degree of substitution (1º, 2º, or 3º). Circle the higher energy (less stable) carbocation in each pair of isomers:

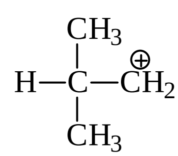


or





or



14. (3) Write the detailed <u>step-by-step</u> mechanism that explains the following reaction (remember that HBr is a strong acid):